Chapter 2, Limits and Continuity Notes

March 3, 2023

1 Limits

Definition 1.1. Let f be a real-valued function. We say that the **limit** of $f(x)$ as x approaches a is L, or

$$\lim_{x \to a} f(x)$$

if, for all $\epsilon > 0$, there exists $\delta > 0$ such that if x is within δ of a (with $x \neq a$), then $f(x)$ is within ϵ of L. We write this more precisely as

$$0 < |x - a| < \delta \Rightarrow |f(x) - L| < \epsilon$$

,

where the "$\Rightarrow$" symbol means "implies":

$$\text{If } 0 < |x - a| < \delta, \text{ then } |f(x) - L| < \epsilon.$$